

REMARKS/ARGUMENTS

Favorable reconsideration of this application as currently amended and in light of the following discussion is respectfully requested.

Claims 1-16 are pending in the present application. Claims 1, 8, 9, and 16 are amended by the present amendment.

In the outstanding Office Action, Claims 9-16 were rejected under 35 U.S.C. §103(a) as unpatentable over Toda (U.S. Patent No. 6,160,610) in view of Yasuda et al. (Japanese Patent Application JP 07-318314, herein “Yasuda”), and Nakayasu et al. (U.S. Patent No. 5,946,537, herein “Nakayasu”), and Claims 1-8 were rejected under 35 U.S.C. §103(a) as unpatentable over Toda, Yasuda, Nakayasu, and Taka et al. (U.S. Patent No. 6,360,070, herein “Taka”).

Regarding the rejection of Claims 9-16 under 35 U.S.C. § 103(a) as unpatentable over Toda, Yasuda, and Nakayasu, independent Claims 9 and 16 have been amended to recite that moiré stripes are formed “alongside the reference position mark” on the photoconductive drum. The claim amendments find support, for example, in Figure 7 and its corresponding description in the specification. No new matter has been added.

Briefly recapitulating, independent Claim 9 is directed to an apparatus for forming an image by use of a plurality of light beams. The apparatus includes, *inter alia*, a unit for forming moiré stripes alongside a reference position mark on the photoconductive drum. In a non-limiting example, Figure 7 shows the moiré stripes pattern M1 and the reference position mark 45 that is indicative of a black band of the moiré stripes, as disclosed in the specification at page 35, lines 5-13. Independent Claim 16 has been amended similar to Claim 9.

By providing the moiré stripes alongside the reference position mark 45, the device of Claims 9 and 16 advantageously measures a shift of the black bands of the moiré stripes of a new pattern M2 relative to the initial pattern M1. Based on the measured shift, the device corrects an eccentricity of the photoconductive drum as disclosed in the specification at page 35, line 14, to page 16, line 24.

In other words, the reference position mark 45 is formed alongside the stripes M1 in order to measure a shift of the moiré stripes when the photoconductive drum has an eccentricity. Further, Applicant notes that a reference position mark 44 is different from the reference position mark 45 and the reference position mark 44 is used for detecting a full rotation of the photoconductive drum as disclosed in the specification at page 35, lines 12-13.

Turning to the applied art, the outstanding Office Action relies on Toda for disclosing an image forming apparatus having a plurality of light beams. However, the outstanding Office Action recognizes at page 3, first full paragraph, that “Toda fails to teach forming a reference position mark on the photoconductive drum, the overlapping lines being slanted lines, and the detecting means for detecting the position of the moiré stripes.”

The outstanding Office Action relies on Yasuda for teaching a length measuring device that forms moiré fringes from slanted lines and detects the position of the moiré fringes by using a detection device as shown in Figure 4. However, Yasuda specifically discloses in the Abstract that the dark/bright moiré stripe “moves in parallel to the moving direction” of a main scale 1 and “[a]long the relative movement direction of both scales, multiple detection parts are arranged.”

In other words, Yasuda discloses forming moiré fringes by using a first main scale 1 and a second detection scale 3 to form interference fringes as disclosed in paragraph [0001]. Further, Yasuda discloses in paragraphs [0012]-[0019] how the moiré fringes are obtained.

However, Yasuda does not teach or suggest “simultaneously drawing overlapping sets of started lines” for forming the moiré fringes required by Claims 9 and 16.

To the contrary, Yasuda has preformed grids 2 and 4 on the scales 1 and 3, respectively, and the moiré fringes are produced by interference. Thus, the claimed pattern of overlapping slanted lines is not taught or disclosed by Yasuda. In fact, Yasuda appears to form the moiré fringes not on a photoconductive drum as claimed but rather on photodetectors 5a, which is different than forming moiré stripes on the photoconductive drum.

In addition, the photodetector 5a in Yasuda is able to detect a relative movement of the moiré fringes without using a reference position mark.

However, the outstanding Office Action asserts at page 3, fourth full paragraph and the paragraph bridging pages 3 and 4, that Nakayasu discloses using a reference position mark and one of ordinary skill in the art would add the reference position mark of Nakayasu to the devices of Toda and Yasuda to arrive at the claimed device.

Applicant respectfully submits that Yasuda clearly discloses that a movement of the moiré fringes is detected without the need of the reference mark and thus, it is not clear why one of ordinary skill in the art, absent hindsight, would need the reference mark of Nakayasu.

In addition, the device of Yasuda uses a moiré pattern created by interference between a main scale grating and an index scale grating and measures a shift of the moiré pattern that occurs when the index scale is moved. Thus, Yasuda utilizes a shift of the moiré pattern associated with the movement of one grating relative to another grating to detect a relative movement of one object to another object. This principle is different than the operational principle of Toda in the sense that the device of Toda cannot generate moiré fringes by interference of two different patterns and move one pattern relative to the other pattern by

moving a grating relative to another grating unless the whole device of Yasuda is included into the device of Toda.

However, there is no motivation on the record why one of ordinary skill in the art would modify so drastically the device of Toda in view of the teachings of Yasuda. The motivation provided by the outstanding Office Action at page 3, third full paragraph, i.e., “to obtain a higher number of stripes” has no basis because there is no showing that the device of Yasuda would increase the number of stripes of Toda. Neither Toda nor Yasuda discloses how many stripes are used. In addition, Toda forms physical lines on the drum while Yasuda forms fringes (not physical lines) on a detector.

Furthermore, a reference position mark alongside the moiré pattern is not necessary for the moiré pattern of Yasuda because the length measuring device of Yasuda detects a shift (movement) of the moiré pattern based on photodetectors, and changes in the pitch of the moiré pattern do not occur in the device of Yasuda. Thus, there is no reason to use the reference position mark of Nakayasu together with the pattern of Yasuda.

Accordingly, for the above-noted reasons, it is respectfully submitted that independent Claims 9 and 16 and each of the claims depending therefrom patentably distinguish over Toda, Yashuda, and Nakayasu, either alone or in combination.

Regarding the rejection of Claims 1-8 under 35 U.S.C. §103(a) as unpatentable over Toda, Yashuda, and Nakayasu, and Taka, independent Claims 1 and 8 have been amended similar to Claims 9 and 16 discussed above. The claim amendments find support in Figure 7 and its corresponding description in the specification. No new matter has been added.

The outstanding Office Action relies on Taka for teaching forming a latent image on a photosensitive drum which is provided with a reference mark as shown in Figure 3. However, the reference sign Q shown in Figure 3 of Taka corresponds to the reference

position mark 44 of Figure 7 and not to the claimed reference position mark 45. In addition, Taka is similar to Nakayasu discussed above and does not overcome the deficiencies of Toda and Yasuda.

Accordingly, it is respectfully submitted that independent Claims 1 and 8 and each of the claims depending therefrom patentably distinguish over Toda, Yashuda, Nakayasu, and Taka, either alone or in combination.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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